UNITED
NATIONS

A

General Assembly

Distr.
GENERAL

A/AC.105/483
5 March 1991

ORIGINAL: ENGLISH

COMMITTEE ON THE PEACEFUL USES
OF OUTER SPACE

REPORT OF THE SCIENTIFIC AND TECHNICAL SUBCOMMITTEE ON THE WORK OF ITS TWENTY-EIGHTH SESSION

INTRODUCTION

1. The Scientific and Technical Subcommittee of the Committee on the Peaceful Uses of Outer Space held its twenty-eighth session at United Nations Headquarters from 19 February to 1 March 1991 under the chairmanship of Professor J. H. Carver (Australia).

2. Representatives of the following Member States attended the session: Argentina, Australia, Austria, Belgium, Benin, Brazil, Bulgaria, Burkina Faso, Cameroon, Canada, Chile, China, Colombia, Czechoslovakia, Ecuador, Egypt, France, Germany, Hungary, India, Indonesia, Iran (Islamic Republic of), Italy, Japan, Lebanon, Mexico, Mongolia, Netherlands, Nigeria, Pakistan, Philippines, Portugal, Romania, Sweden, Syrian Arab Republic, Turkey, Ukrainian Soviet Socialist Republic, Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland, United States of America, Uruguay, Venezuela, Viet Nam and Yugoslavia.

3. Representatives of the Department of Technical Cooperation for Development and the Office of Legal Affairs of the United Nations Secretariat and the Economic and Social Commission for Asia and the Pacific (ESCAP) also attended the session.

4. Representatives of the following specialized agencies attended the session: Food and Agriculture Organization of the United Nations (FAO), International Civil Aviation Organization (ICAO), World Meteorological Organization (WMO), International Atomic Energy Agency (IAEA) and United Nations Educational, Scientific and Cultural Organization (UNESCO).

5. Representatives of the European Space Agency (ESA), the International Maritime Satellite Organization (INMARSAT), the International Organization for Space Communications (INTERSPUTNIK), the International Telecommunications Satellite Organization (INTELSAT), the Council on International Cooperation in the Study and Utilization of Outer Space (INTERCOSMOS), the Committee on Space Research (COSPAR)

READEX FICHE

of the International Council of Scientific Unions (ICSU), the International Astronautical Federation (IAF) and the International Society for Photogrammetry and Remote Sensing (ISPRS) also attended the session.

6. A list of the representatives of Member States, specialized agencies and other international organizations attending the session is contained in document A/AC.105/C.1/INF/20.

7. At the opening of the session, the Subcommittee adopted the following agenda:

1. Adoption of the agenda.

2. Statement by the Chairman.

3. General exchange of views.

4. United Nations Programme on Space Applications and the co-ordination of space activities within the United Nations system.

5. Implementation of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space.

6. Matters relating to remote sensing of the Earth by satellites, including, inter alia, applications for developing countries.

7. Use of nuclear power sources in outer space.

8. Questions relating to space transportation systems and their implications for future activities in space.

9. Examination of the physical nature and technical attributes of the geostationary orbit; examination of its utilization and applications, including, inter alia, in the field of space communications, as well as other questions relating to space communications developments, taking particular account of the needs and interests of developing countries.

10. Matters relating to life sciences, including space medicine.

11. Progress in national and international space activities related to the Earth environment, in particular progress in the geosphere-biosphere (global change) programme.

12. Matters relating to planetary exploration.

13. Matters relating to astronomy.

14. The theme fixed for special attention at the 1991 session of the Scientific and Technical Subcommittee: "Applications of airborne and satellite remote sensing for prospecting mineral and groundwater resources and for monitoring and managing biological resources, with

emphasis on agriculture, taking into particular account the needs of developing countries".

15. Other matters.

16. Report to the Committee on the Peaceful Uses of Outer Space.

Meetings and documentation

8. The Subcommittee held 17 meetings.

9. A list of the documents which were before the Subcommittee is provided in annex I to the present report.

10. At the opening meeting, the Chairman made a statement outlining the work of the Subcommittee at its current session. He also reviewed the activities of Member States in the field of space exploration, including important advances that had been achieved as a result of international cooperation during the past year.

11. At the 386th, 388th, 391st and 397th meetings, the Chairman informed the Subcommittee that requests had been received from the permanent representatives of Greece, Spain, Cuba, the Libyan Arab Jamahiriya, Malaysia and Ghana, as well as from the Permanent Observer for the Holy See, to attend the session. Following past practice, those delegations were invited to attend the current session of the Subcommittee and to address it as appropriate. This was without prejudice to further requests of that nature and did not involve any decision of the Subcommittee concerning status, but was a courtesy that the Subcommittee extended to those delegations.

12. General statements were made by the following delegations: Argentina, Australia, Austria, Bulgaria, Germany, India, Indonesia, Nigeria, Pakistan, Turkey, Ukrainian Soviet Socialist Republic, Union of Soviet Socialist Republics and United States of America. Statements were also made by the representatives of FAO, ESA, INMARSAT, INTERSPUTNIK, INTELSAT, COSPAR and IAF.

13. At the 386th meeting, the Chief of the Outer Space Affairs Division made a statement reviewing the work programme of the Outer Space Affairs Division. At the 388th meeting, the Expert on Space Applications made a statement outlining the activities carried out and planned under the United Nations Programme on Space Applications.

Technical presentations

14. In accordance with paragraph 7 (b) (vii) of General Assembly resolution 45/72 of 11 December 1990, a symposium on the theme "Applications of airborne and satellite remote sensing for prospecting mineral and groundwater resources and for monitoring and managing biological resources, with emphasis on agriculture, taking into particular account the needs of developing countries", sponsored by IAF and

COSPAR, was held in two sessions. The first session of the symposium was chaired by Mr. George Ohring, Chairman of the COSPAR Commission on Space Studies of the Earth's Surface, Meteorology and Climate. It included presentations by Mr. James V. Taranik of the University of Nevada Desert Research Institute, United States, on "Applications of Remote Sensing for General Geology, Oil and Mineral Resources"; by Mr. Massimo Menenti of the Winand Staring Centre, the Netherlands, on "Applications of Remote Sensing for Water Resources"; by Mr. Lawrence C. Rowan of the United States Geological Survey, on "Applications of Remote Sensing for Mineral Resources"; and by Mr. Nicolay V. Mezhelovsky of the USSR Ministry of Geology, on "Remote Sensing: New Capabilities for the Study of Natural Resources". The second session was chaired by Mr. Dale Fester, Vice-President of IAF. It included presentations by Dr. Réjean Simard of the Canada Center for Remote Sensing, on "The Global Change Encyclopaedia: A Project for International Space Year"; by Dr. Roberto Pereira da Cunha of the Brazil National Institute for Space Research, on "Applications of Remote Sensing for Deforestation"; by Dr. M. G. Chandrasekhar, on behalf of Prof. U. R. Rao of the Indian Space Research Organization, on "Applications of Remote Sensing for the Management of Land Resources"; and Mr. Edwin I. Cissel of the United States Department of Agriculture, on "Applications of Remote Sensing for Agricultural Resources".

15. In accordance with paragraph 7 (b) (iv) of General Assembly resolution 45/72, COSPAR arranged a special presentation on "The International Geosphere-Biosphere Programme: The Challenge for Remote Sensing". The presentation was made by Mr. John Townshend of the Department of Geography of the University of Maryland, United States.

16. During the session of the Subcommittee, in addition to the COSPAR/IAF symposium, special scientific and technical presentations were made by Mr. Todd Hawley of the International Space University (ISU) on "Progress towards the permanent ISU campus in 1992"; by Mr. James Harford of IAF, on the 1992 COSPAR/IAF World Space Congress; by Dr. Wesley T. Huntress of the United States National Aeronautics and Space Administration (NASA), on "Voyage to the Planets"; by Astronaut Vance Brand of NASA, on the Space Shuttle programme; by Dr. Dan Tarpley of the United States National Oceanic and Atmospheric Administration (NOAA), on remote sensing; by Dr. Arnauld Nicogossian of NASA and Academician Oleg Gazenko of the USSR Institute of Medical and Biological Problems, on life sciences and space medicine; by Dr. Gunther Riegler of NASA, on "From the Universe to the Laboratory: Using Space Data for Research and Education"; by Mr. Sinichi Nakayama of the Japan Science and Technology Agency, on "Space Development Activities of Japan"; by Ms. Diane Thompson of the Canadian Remote Sensing Society, on "Airborne Remote Sensing for Global Resource Monitoring", by Dr. Jan J. Nossin of the International Institute on Aerial Survey and Earch Science (ITC), Netherlands, on "Transfer of Knowledge on Remote Sensing Applications to Developing Countries"; by Dr. M. G. Chandrasekhar, of the Indian Space Research Organization, on space debris; by Dr. B. Pfeiffer, of the secretariat for the Space Agency Forum for International Space Year (SAFISY), on SAFISY activities; by Dr. Roberto Pereira da Cunha of the Brazil National Institute for Space Research, on International Space Year - World Forest Watch (WFW) programmes; and by Mr. José M. Quintana (Spain) on satellite astronomy.

Recommendations of the Scientific and Technical Subcommittee

17. After considering the various items before it, the Subcommittee, at its 402nd meeting, on 1 March 1991, adopted its report to the Committee on the Peaceful Uses of Outer Space containing its views and recommendations as set out in the paragraphs below.

I. UNITED NATIONS PROGRAMME ON SPACE APPLICATIONS AND THE COORDINATION OF SPACE ACTIVITIES WITHIN THE UNITED NATIONS SYSTEM

II. IMPLEMENTATION OF THE RECOMMENDATIONS OF THE SECOND UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE

18. In accordance with General Assembly resolution 45/72, the Subcommittee continued its consideration of these items. In accordance with past practice, the Subcommittee considered the two items jointly.

19. The Subcommittee noted that the General Assembly, in paragraph 13 of resolution 45/72, had once again emphasized the urgency and importance of implementing fully the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82) as early as possible. The Subcommittee also took note of paragraph 8 of the same resolution, in which the General Assembly had stated that, in the context of the Subcommittee's consideration of the item, it was particularly urgent to implement the following recommendations:

"(a) All countries should have the opportunity to use the techniques resulting from medical studies in space;

"(b) Data banks at the national and regional levels should be strengthened and expanded and an international space information service should be established to function as a centre of coordination;

"(c) The United Nations should support the creation of adequate training centres at the regional level, linked, whenever possible, to institutions implementing space programmes; necessary funding for the development of such centres should be made available through financial institutions;

"(d) The United Nations should organize a fellowship programme through which selected graduates or postgraduates from developing countries should get in-depth, long-term exposure to space technology or applications; it is also desirable to encourage the availability of opportunities for such exposure on other bilateral and multilateral bases outside the United Nations system."

20. In response to the recommendations of the Working Group of the Whole to Evaluate the Implementation of the Recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space contained in its report on the work of its fourth session held in 1990 (A/AC.105/456, annex II,

paras. 4, 5 and 6), endorsed by the General Assembly in paragraph 10 of resolution 45/72, the Subcommittee had before it the following documents: a report on international cooperation in the peaceful uses of outer space: activities of Member States (A/AC.105/470), containing information submitted by Member States in response to paragraphs 4 (c), 4 (j) and 6 (b) of the report of the Working Group; a list of experts in space technology and applications (A/AC.105/460 and Add.1), in response to paragraph 4 (e); a report on cooperative arrangements in support of the implementation of the United Nations Programme on Space Applications (A/AC.105/473), in response to paragraph 4 (f); a report on economic aspects of strengthening and expanding national and regional data banks and establishing an international space information service as a coordinating centre (A/AC.105/474), in response to paragraph 4 (m); a study on applications of space technology to flood monitoring and control (A/AC.105/472), in response to paragraph 5 (b) (iv); a report on upper atmosphere studies for weather and environment monitoring (A/AC.105/477), in response to paragraph 5 (b) (vii); a report on the implementation of the recommendations of UNISPACE 82: actions by international organizations (A/AC.105/475), in response to paragraph 6 (a). In addition, the Subcommittee had before it annual reports, including information in response to paragraph 4 (d), submitted by the following international organizations: the International Telecommunication Union (ITU) (A/AC.105/462), INMARSAT (A/AC.105/466), the European Telecommunications Satellite Organization (EUTELSAT) (A/AC.105/467), INTELSAT (A/AC.105/480) and INTERCOSMOS (A/AC.105/481). The Subcommittee also had before it a working paper submitted by the USSR (A/AC.105/C.1/L.171 and Add.1).

21. In accordance with paragraph 9 of General Assembly resolution 45/72, the Subcommittee reconvened the Working Group of the Whole with a view to improving the execution of activities relating to international cooperation, particularly those included in the United Nations Programme on Space Applications, and to proposing concrete steps to increase such cooperation as well as to make it more efficient. The Working Group was chaired by Mr. Muhammad Nasim Shah (Pakistan); it held four meetings between 21 and 26 February 1991 and adopted its report (A/AC.105/C.1/WG.6/L.6) on 26 February 1991.

22. Having considered the report of the Working Group of the Whole, the Subcommittee decided at its 400th meeting, on 28 February 1991, to adopt that report, as contained in annex II to the present report, on the understanding that the recommendations contained therein would be carried out in accordance with paragraph 9 of General Assembly resolution 37/90 of 10 December 1982. The Subcommittee recommended that the Working Group of the Whole be reconvened the next year to continue its work.

A. United Nations Programme on Space Applications

23. Regarding the expanded United Nations Programme on Space Applications, the Subcommittee had before it the report of the United Nations Expert on Space Applications (A/AC.105/478). The report was supplemented by the statement by the Expert. The Subcommittee noted that the Programme on Space Applications for 1990 had been carried out satisfactorily and commended the work accomplished by the

Expert in carrying out the work programme as endorsed by the Subcommittee at its last session.

24. The Subcommittee noted with appreciation that since its last session additional contributions had been offered by various Member States and organizations and that they had been acknowledged with appreciation in paragraph 52 of the Expert's report, as well as under appropriate sections of the present report.

25. In this connection, the Subcommittee continued to express its concern over the limited financial resources available for carrying out the Programme and appealed to Member States to support the Programme through voluntary contributions. The Subcommittee felt that the limited resources of the United Nations should be focused on the highest priority activities and noted that the Programme on Space Applications was the priority activity of the Outer Space Affairs Division.

1. 1990-1991

(a) Long-range fellowships for in-depth training

26. The Subcommittee expressed its appreciation to the Governments of Austria, Brazil, China and the USSR as well as to ESA for having offered the training fellowships for the period 1990-1991 that were currently being conducted, as shown in the annex to the Expert's report (A/AC.105/478). The Subcommittee noted with appreciation that the offers of fellowships were to be continued for 1991-1992 by the same Governments and organization, as indicated by the Expert in his statement.

27. The Subcommittee noted that it was important to increase the opportunities for in-depth education in all areas of space science, technology and applications through long-term fellowships.

(b) Technical advisory services

28. The Subcommittee took note of the technical advisory services provided by the Outer Space Affairs Division in support of regional space applications projects, as indicated in the report of the Expert (A/AC.105/478):

(a) Assistance to the Government of Costa Rica in the organization of the Space Conference of the Americas: Prospects of Cooperation for Development, held at San José from 12 to 16 March 1990;

(b) Participation, in cooperation with the European Space Agency, in a survey for the selection of sites for the acquisition of satellite data for remote sensing applications in African countries within range of ESA ground stations, as a follow-up to the United Nations/United Nations Development Programme (UNDP)/FAO/ESA Meeting of Experts on Remote Sensing and Satellite Meteorology Applications to Marine Resources and Coastal Management (see A/AC.105/436);

(c) Assistance to the Economic Commission for Africa (ECA) and the Governing Council of the Regional Centre for Services in Surveying, Mapping and Remote Sensing through participation in a fact-finding mission to the Regional Centre at Nairobi.

29. The Subcommittee also noted that the Division would assist the Centro de Levantamientos Integrados de Recursos Naturales por Sensores Remotos (CLIRSEN) of Ecuador in a survey of Member States within range of the Cotopaxi Remote Sensing Ground Receiving Station in order to provide those States with information on the services to be provided by the station.

(c) United Nations workshops/training courses/seminars/meetings of experts

30. With regard to the activities of the Programme carried out in 1990, the Subcommittee expressed its appreciation to:

(a) The Government of Sweden for co-sponsoring the United Nations International Training Course on Remote Sensing Education for Educators, hosted by the University of Stockholm and the Swedish Space Corporation and held at Stockholm and Kiruna from 14 May to 15 June 1990 (A/AC.105/463);

(b) The Government of Cuba for co-sponsoring the United Nations Workshop on Space Communications for Development, hosted by the Ministry of Communications of Cuba and held at Havana from 26 to 30 March 1990 (A/AC.105/469);

(c) The Government of Brazil, as well as FAO and ESA, for co-sponsoring the United Nations/FAO/ESA Workshop on Microwave Remote Sensing Technology, hosted by the Instituto Nacional de Pesquisas Espaciais (INPE) at São José dos Campos from 19 to 23 November 1990 (A/AC.105/471).

31. The Subcommittee also noted that the United Nations, through the Programme on Space Applications, had co-sponsored and financially supported the United Nations/FAO International Training Course on Agricultural Applications of Remote Sensing, hosted by the Agricultural University of Prague from 18 to 29 June 1990, and the United Nations/FAO/ESA International Workshop on Remote Sensing: Geo-information Technology for Decision-Makers, co-sponsored by the Government of France and hosted by FAO at Rome from 7 to 16 November 1990.

32. The Subcommittee took note of the status of the 1991 programme of United Nations workshops/training courses/seminars/meetings of experts, which included the following activities, as described in paragraph 33 of the Expert's report (A/AC.105/478):

(a) The United Nations/ESA Workshop on Basic Space Research, to be organized in cooperation with the Government of India for the benefit of countries in the regions of the Economic and Social Commission for Asia and the Pacific (ESCAP) and the Economic and Social Commission for Western Asia (ESCWA) and to be held at the Indian Space Research Organization in Bangalore, India, from 30 April to 4 May 1991;

(b) The third United Nations/FAO/ESA Workshop on Microwave Remote Sensing Technology, to be organized in cooperation with the Government of Spain for the benefit of countries in the regions of ECA and ESCWA and held at the Instituto Nacional de Técnica Aeroespacial (INTA) ground station in Maspalomas, Canary Islands, Spain, from 10 to 14 June 1991;

(c) The third United Nations International Training Course on the use of Remote Sensing in Geologic Sciences, in cooperation with the Free University of Berlin and the Central Institute of the Physics of the Earth, Potsdam, Germany, 30 September to 18 October 1991;

(d) The International Training Course on Remote Sensing Applications for Environmental Assessment and Monitoring, to be organized in cooperation with the Government of the United States and held at the Earth Resources Observation System (EROS) Data Center in Sioux Falls, South Dakota, from 9 September to 4 October 1991;

(e) The United Nations/FAO/ECA Regional Seminar on Remote Sensing for Decision-Makers, to be organized in cooperation with the Government of Kenya and held at the Regional Centre for Services in Surveying, Mapping and Remote Sensing in Nairobi, from 17 to 21 June 1991;

(f) The United Nations Regional Workshop on the Application of Space Techniques to Combat Natural Disasters, to be co-sponsored by the Office of the United Nations Disaster Relief Coordinator (UNDRO), WMO and UNESCO, in cooperation with the Government of China and ESCAP, for the benefit of countries in the ESCAP region, and hosted by the State Science and Technology Commission of China at Beijing from 16 to 20 September 1991;

(g) The sixth United Nations/FAO/WMO/ESA Training Course on the Applications of Remote Sensing in Agrometeorological and Hydrological Studies, to be organized in cooperation with the Government of Peru for the benefit of countries in the region of the Economic Commission for Latin America and the Caribbean (ECLAC) from 7 to 25 October 1991.

(d) Promotion of greater cooperation in space science and technology

33. The Subcommittee noted that during the thirty-third Plenary Meeting of COSPAR, held at The Hague in June-July 1990, the United Nations, through the Programme on Space Applications, had co-sponsored a special panel on the "Equatorial Electrojet and Related Phenomena" and provided financial support for a participant from a developing country, and that during the forty-first IAF Congress held at Dresden, Germany, in October 1990, the United Nations had co-sponsored a special session on "Space and Forest Management" and supported the participation of three speakers from developing countries.

34. The Subcommittee also noted that the United Nations, through the Programme on Space Applications, would co-sponsor the following activities: a Workshop on Space Technologies for Development, to be held at Montreal, Canada, from 2 to 5 October 1991, in conjunction with the forty-second IAF Congress; a special

workshop at the 17th Congress of the International Society for Photogrammetry and Remote Sensing, to be held in Washington in August 1992; and a special workshop for developing countries, to be organized during the COSPAR/IAF World Space Congress to be held in Washington in August-September 1992.

2. 1992

United Nations workshops/training courses/seminars/meetings of experts

35. The Subcommittee recommended the approval of the following programme of workshops/training courses/seminars/meetings of experts proposed for 1992:

(a) A United Nations/United States International Conference on Satellite Remote Sensing for Resource Management, Environmental Assessment and Global Change Studies: Needs and Applications for the Developing World, to be held in Washington;

(b) The seventh United Nations/FAO/WMO/ESA Training Course on the Applications of Remote Sensing in Agrometeorological and Hydrological Studies, to be held at Nairobi;

(c) The second United Nations/Sweden Training Course on Remote Sensing Education for Educators, to be held at Stockholm and Kiruna, Sweden;

(d) The third International Seminar on Satellite Communications, to be organized by the United Nations in cooperation with the Government of the USSR and held in Moscow;

(e) A United Nations/FAO/International Centre for Theoretical Physics (ICTP) Training Course on Remote Sensing Applications, to be held in Rome;

(f) A United Nations Regional Communications Workshop, to be organized in cooperation with the Government of China, for the benefit of States in the ESCAP region;

(g) A United Nations/UNESCO/WMO/ICTP Conference on Bridging the Information Gap in Space Science and Technology, to be held at United Nations Headquarters.

B. International space information service

36. The Subcommittee noted with satisfaction that the Outer Space Affairs Division was in the process of developing an international space information system, including both information within the United Nations system and access to external databases. The Subcommittee took note of the report on the economic aspects of strengthening and expanding national and regional data banks and establishing an international space information service (A/AC.105/474), prepared by the Secretariat as requested by the Working Group of the Whole.

37. The Subcommittee noted with satisfaction the publication of the document entitled "Seminars of the United Nations Programme on Space Applications: Selected Papers on Remote Sensing Technology and Satellite Communications (A/AC.105/468) and the list of experts in space technology and applications (A/AC.105/460 and Add.1), as recommended by the Working Group of the Whole. It also noted that for 1992 the Secretariat would prepare updated editions of the Directory on Education, Training, Research and Fellowship Opportunities in Space Science and Technology and its Applications (A/AC.105/432) and the Directory of Information Systems on Space Science and Technology (A/AC.105/397/Rev.1 and Add.1).

C. Reports

38. The Subcommittee noted with appreciation the reports submitted to it in response to the recommendations of the Working Group of the Whole in its report on its fourth session (A/AC.105/456, annex II, paras. 4, 5 and 6). It noted in particular the technical studies prepared by the Secretariat on flood monitoring and control (A/AC.105/472) and on upper atmosphere studies for weather and environment monitoring (A/AC.105/477).

D. Coordination of space activities within the United Nations system and inter-agency cooperation

39. The Subcommittee noted that the General Assembly, at its forty-fifth session, had reaffirmed its request that all organs, organizations and bodies of the United Nations system and other intergovernmental organizations working in the field of outer space or on space-related matters should cooperate in the implementation of the recommendations of UNISPACE 82.

40. The Subcommittee noted with satisfaction that the twelfth Inter-Agency Meeting on Outer Space Activities had been convened by the Administrative Committee on Coordination (ACC) in Rome and hosted by FAO from 26 to 28 September 1990 and that its report (ACC/1989/PG/9) was before the Subcommittee. The Subcommittee took note of the information provided on the progress achieved in the coordination of space activities among organizations within the United Nations system and expressed its appreciation for the report of the Secretary-General entitled "Coordination of outer space activities within the United Nations system: programmes of work for 1991 and 1992 and future years" (A/AC.105/465).

41. The Subcommittee continued to stress the necessity of ensuring continuous and effective consultations and coordination in the field of outer space activities among organizations within the United Nations system and the avoidance of duplication of activities.

E. Regional and interregional mechanisms of cooperation

42. The Subcommittee noted that the General Assembly, in its resolution 45/72, had reaffirmed its approval of the recommendation of UNISPACE 82 regarding the

establishment and strengthening of regional mechanisms of cooperation and their promotion and creation through the United Nations system. The Subcommittee noted with satisfaction that, in carrying out various activities in the implementation of recommendations of UNISPACE 82, the Secretariat had sought to strengthen those mechanisms.

43. The Subcommittee took note of the efforts undertaken as part of the United Nations Programme on Space Applications, in accordance with the UNISPACE 82 recommendation concerning the development of indigenous capabilities, to establish regional centres for space science and technology education in existing national or regional educational institutions in developing countries, as recommended by the Committee on the Peaceful Uses of Outer Space and endorsed by the General Assembly in resolution 45/72, and as outlined in paragraphs 35 to 44 of the report of the Expert (A/AC.105/478). The Subcommittee urged Member States to support the development of such regional centres. The Subcommittee requested the Outer Space Affairs Division to keep it informed of further developments on the subject. The Subcommittee also requested the Outer Space Affairs Division to make every possible effort to obtain the support of other relevant international organizations and requested that it be kept informed of further developments on the subject.

44. The Subcommittee took note of the contributions made by other international organizations towards the promotion of international cooperation in outer space: FAO was continuing its activities relating to remote sensing of renewable natural resources, including training courses, support of development projects and monitoring environmental conditions for the FAO Early Warning System on Food and Agriculture; ITU was continuing its work in the international coordination of space communications, including planning the 1992 World Administrative Radio Conference, providing technical assistance to developing countries and assisting in the development of a regional communication satellite system for Africa (RASCOM); INMARSAT was continuing to develop its satellite communication system for maritime, land-mobile and aeronautical communications, including developing small, low-cost terminals and providing technical assistance and training; INTELSAT was further developing its system for international satellite communications, including its programme for training and education in the use of communication satellites; ESA was continuing its programme of international cooperative space activities, including training programmes for the benefit of developing countries, support of the activities of the United Nations Programme on Space Applications and technical assistance projects; and INTERSPUTNIK was continuing to develop its communication satellite system and its programme of assistance to developing countries through dissemination of information and assistance in Earth station development.

45. The Subcommittee emphasized the importance of regional and international cooperation in making the benefits of space technology available to all countries, through such cooperative activities as shared payloads, dissemination of information on spin-off benefits, ensuring compatibility of space systems and providing access to launch capabilities at reasonable cost.

III. MATTERS RELATING TO REMOTE SENSING OF THE EARTH BY SATELLITES INCLUDING, INTER ALIA, APPLICATIONS FOR DEVELOPING COUNTRIES

46. In accordance with General Assembly resolution 45/72, the Subcommittee continued its consideration of this item.

47. In the course of the debate, delegations reviewed the national and cooperative programmes in remote sensing. Examples were given of national programmes in developing and developed countries and of international programmes based on bilateral, regional and international cooperation, including programmes of technical cooperation between developing countries. Countries with advanced capabilities in the field, including some developing countries, described programmes to provide assistance to other developing countries.

48. The Subcommittee took note of the continuing programmes of China, France, India, Japan, the USSR and the United States for remote-sensing satellites as well as the planned remote-sensing satellite systems of Brazil, Canada and ESA. It also took note of the remote-sensing activities of FAO for mapping, assessment and management of renewable natural resources for the benefit of developing countries. The Subcommittee heard special presentations on remote sensing by experts from Canada, the Netherlands and the United States, as mentioned in paragraph 16 of the present report.

49. The Subcommittee reiterated its view that remote-sensing activities should take into account the need to provide appropriate and non-discriminatory assistance to meet the needs of the developing countries.

50. The Subcommittee emphasized the importance of making remote-sensing data and analysed information available to all countries at reasonable cost and in a timely manner. The Subcommittee also recognized the need for continuing free access to data from operational meteorological satellites.

51. The Subcommittee felt that international cooperation in the use of remote-sensing satellites should be encouraged, both through coordination of the operations of ground stations and through regular meetings between satellite operators and users. It noted the importance of compatibility and complementarity of existing and future remote-sensing systems. The Subcommittee also noted the importance, particularly for the developing countries, of sharing experiences and technologies, of cooperation through international and regional remote-sensing centres and of joint work on collaborative projects.

52. Recalling General Assembly resolution 41/65 of 3 December 1986, by which the Assembly had adopted the Principles Relating to Remote Sensing of the Earth from Outer Space, the Subcommittee recommended that at its twenty-ninth session it continue its discussion on remote-sensing activities conducted in accordance with those principles, during its consideration of the agenda item concerning remote sensing.

53. The Subcommittee recommended that the item be retained on its agenda as a priority item for the next session.

IV. USE OF NUCLEAR POWER SOURCES IN OUTER SPACE

54. In accordance with General Assembly resolution 45/72, the Subcommittee continued its consideration of this item.

55. The Subcommittee noted that, on the basis of the work of the Subcommittee and its Working Group on the Use of Nuclear Power Sources in Outer Space at its last session, the Legal Subcommittee's Working Group on the question had been able to agree on a text for draft principle 3 relating to guidelines and criteria for safe use (A/AC.105/457, annex I, para. 12).

56. The Subcommittee noted that the scientific and technical guidelines and criteria for the safe use of nuclear power sources in outer space could, in the future, be reviewed and revised as necessary, as provided in draft principle 12 of the draft principles contained in document A/AC.105/C.2/L.154/Rev.7.

57. The Subcommittee took note of the work being done in IAEA and other international organizations concerning international principles of radiation protection. Some delegations noted that the Subcommittee's recommendations on principles for the safe use of nuclear power sources should be harmonized with any relevant internationally adopted safety guidelines and standards dealing with nuclear power sources, including those of IAEA and other international organizations.

58. The Subcommittee took note of a working paper submitted by the United States (A/AC.105/C.1/L.176). According to that delegation, the working paper revisited certain portions of the Subcommittee's recommendations underlying draft principle 3, with a view to the Subcommittee's making specific modifications to ensure the technical accuracy of the recommendations, as a step towards contributing further to the substantial progress made in the Subcommittee on this subject.

59. In this connection, other delegations expressed the view that, in the consideration of the draft principles, discussion of draft principle 3 should not be reopened. Those same delegations also expressed the view that work should continue on the remaining principles on which agreement had not yet been reached.

60. The view was expressed that without reopening discussion of draft principle 3, further exchange of views might take place within the Subcommittee on document A/AC.105/C.1/L.176 in line with draft principle 12.

61. The view was also expressed that principle 3 should be reopened.

62. The Subcommittee agreed that Member States should be invited to report to the Secretary-General on a regular basis with regard to national and international research concerning the safety of nuclear powered satellites.

63. The Subcommittee agreed that further studies should be conducted on the problem of the collision of nuclear power sources with space debris and that the Subcommittee should be kept informed of the results of such studies. The view was

expressed that an international expert group should be established to consider the problem.

64. The Subcommittee recommended that the item be retained on its agenda for the next session. The Subcommittee further recommended that the question of reconvening the Working Group on the Use of Nuclear Power Sources in Outer Space be considered by the Committee at its next session in the light of the work carried out by the Legal Subcommittee on the subject at its thirtieth session.

V. QUESTIONS RELATING TO SPACE TRANSPORTATION SYSTEMS AND THEIR IMPLICATIONS FOR FUTURE ACTIVITIES IN SPACE

65. In accordance with General Assembly resolution 45/72, the Subcommittee continued its consideration of this item. The Subcommittee heard a special presentation by a United States astronaut on the Space Shuttle programme, as mentioned in paragraph 16 of the present report.

66. The Subcommittee noted that 1991 was the thirtieth anniversary of the first human space flight.

67. In the course of the discussion, delegations reviewed the national and cooperative programmes in space transportation systems. In particular, the Subcommittee noted that:

(a) China had launched a communication satellite, the FY-1 meteorological satellite, and a recoverable satellite for remote sensing, life science and material science, as well as providing launches for the Asiasat commercial communication satellite and Pakistan's Badr experimental satellite. It had also continued developmental work on new models of the Long March series of launchers;

(b) Japan had launched a BS broadcasting satellite and the second Marine Observation Satellite (MOS) into Earth orbit, as well as launching the Muses spacecraft into a lunar trajectory to test precision orbit-control technology, data transmission systems and lunar swing-by procedures for use in future planetary missions. Japan had also continued work on new launchers;

(c) In 1990, the USSR had continued its very active programme of space flights. The year had seen the end of two long-duration flights aboard the Mir space station by two cosmonauts, the beginning of a new mission by two other cosmonauts, a short visit by a Japanese cosmonaut and the expansion of the station by the addition of the Kristall module for microgravity research and other space research. Throughout the year, astrophysical, geophysical, biological and medical experiments had been conducted aboard the station. Training for future missions had begun for cosmonauts from Austria, France, Germany and the United Kingdom. The USSR had also launched the Gamma astrophysical observatory and satellites in the Cosmos, Resurs-F, Raduga, Raduga-1, Gorizont, Molniya-1, Molniya-3, Meteor-2, Okean, Nadezhda and Foton satellites for space research, remote sensing, communications, meteorology, oceanography, search and rescue, and microgravity research. These satellites had been launched by Soyuz, Proton, Cosmos, Tsyklon, Molniya and Zenit launchers;

(d) The United States had continued work on the development of the International Space Station Freedom, in cooperation with Canada, Japan and ESA. Six Space Shuttle flights had taken place in 1990, launching the Hubble Space Telescope and the ESA Ulysses solar polar observer, carrying the Astro astronomical observatory, recovering the Long Duration Exposure Facility and conducting microgravity research. Other United States launch vehicles had launched the Combined Release and Radiation Effects Satellite for scientific research and two small Multiple Access Communication Satellites, as well as the Rosat X-ray observatory in cooperation with Germany, an Insat communication and meteorological satellite for India, a Marcopolo broadcasting satellite for the United Kingdom and communication satellites for Indonesia, the United Kingdom, Japan, INMARSAT and INTELSAT. Developmental work had continued on increasing the duration of Shuttle flights and developing advanced launchers, including the National Aerospace Plane;

(e) ESA had continued developmental work on the heavy launcher Ariane V, the space plane Hermes and the Columbus system, including elements provided for the international space station programme. The Ariane launcher developed by ESA had launched the Spot-2 remote-sensing satellite and the TDF broadcasting satellite for France and communication satellites for Germany, the United Kingdom, the United States, EUTELSAT and INTELSAT.

68. The Subcommittee noted the developments in various programmes related to space transportation and stressed the importance of international cooperation for providing all countries with access to the benefits of space science and technology.

69. The Subcommittee recommended that consideration of the item be continued at its next session.

VI. EXAMINATION OF THE PHYSICAL NATURE AND TECHNICAL ATTRIBUTES OF THE GEOSTATIONARY ORBIT; EXAMINATION OF ITS UTILIZATION AND APPLICATIONS, INCLUDING, INTER ALIA, IN THE FIELD OF SPACE COMMUNICATIONS, AS WELL AS OTHER QUESTIONS RELATING TO SPACE COMMUNICATIONS DEVELOPMENTS, TAKING PARTICULAR ACCOUNT OF THE NEEDS AND INTERESTS OF DEVELOPING COUNTRIES

70. In accordance with General Assembly resolution 45/72, the Subcommittee continued consideration of this item.

71. In the course of the consideration of the item, some delegations expressed the view that the Subcommittee should contribute to the work of the Legal Subcommittee in its consideration of the question of the geostationary orbit.

72. Some delegations expressed the view that the geostationary orbit was a limited natural resource subject to saturation, that the existing technological and coordination procedures were not adequate, and that a special regime was required to ensure equitable access by all States, in particular developing countries. They felt that the roles of ITU and the Committee on the Peaceful Uses of Outer Space with respect to the geostationary orbit were complementary. Other delegations

expressed the view that in considering the question of equitable access, account should be taken in particular of the characteristics of the equatorial countries.

73. Other delegations expressed the view that questions relating to the geostationary orbit were being addressed effectively in ITU. They reviewed developments in national and international space communications programmes, which would contribute to ensuring that all countries would have access to satellite communications.

74. The Subcommittee took note of the various current and planned satellite communications programmes of Member States and of international organizations, including INMARSAT, INTELSAT and INTERSPUTNIK.

75. The Subcommittee recommended that consideration of the item be continued at its next session.

VII. MATTERS RELATING TO LIFE SCIENCES, INCLUDING SPACE MEDICINE

76. In accordance with General Assembly resolution 45/72, the Subcommittee continued its consideration of this item. The Subcommittee heard special presentations on the question by experts from the USSR and the United States, as mentioned in paragraph 16 of the present report. The Subcommittee took note of working papers submitted by the USSR (A/AC.105/C.1/L.172) and the Netherlands (A/AC.105/C.1/L.177).

77. The Subcommittee noted that studies of human physiology under the microgravity conditions of space flight had led to important advances in medical knowledge in such areas as the vestibular apparatus, blood circulation, biomechanics and metabolism. It noted that products of space biotechnology, such as pharmaceuticals, could have an important impact on health care on Earth.

78. The Subcommittee noted that space technologies were demonstrating growing promise in medical applications, most notably in the global monitoring of disease and in disaster relief. Airborne and space-based remote-sensing technologies could permit the formulation of predictive models for the spread of vector-borne diseases such as malaria. The recent "Telemedicine Spacebridge" linking United States and USSR medical centres via satellite enabled consultations to assist the victims of the 1988 earthquake in Armenia. In addition, research in space would advance the biomedical sciences and improve the quality of life on Earth. The techniques and lessons learned from these space-based activities could contribute substantially to educational programmes in these areas all over the world. The Subcommittee endorsed the value of space for these purposes and encouraged Member States to study further the potential future benefits of these activities, perhaps in conjunction with the World Health Organization and other relevant organizations.

79. The Subcommittee noted that space studies in life sciences and medicine had important potential benefits for all countries and that efforts should be made to promote international cooperation to enable all countries to benefit from those advances. In this connection, the Subcommittee recalled that the General Assembly,

in resolution 45/72, considered it particularly important that all countries should have the opportunity to use the techniques resulting from medical studies in space.

80. The Subcommittee recommended that the Secretariat prepare a study of medical technology that had resulted from research in space, based on information compiled from existing sources and information submitted by Member States, and of the ways and means to implement the General Assembly recommendation on this matter, as contained in paragrah 8 of resolution 45/72.

81. The Subcommittee recommended that consideration of the item be continued at its next session.

VIII. PROGRESS IN NATIONAL AND INTERNATIONAL SPACE ACTIVITIES RELATED TO THE EARTH ENVIRONMENT, IN PARTICULAR PROGRESS IN THE GEOSPHERE-BIOSPHERE (GLOBAL CHANGE) PROGRAMME

82. In accordance with General Assembly resolution 45/72, the Subcommittee continued its consideration of this item.

83. The Subcommittee noted with satisfaction that, at its invitation, COSPAR and IAF had arranged a special presentation to the Subcommittee on the International Geosphere-Biosphere Programme, as mentioned in paragraph 15 of the present report. The Subcommittee expressed its appreciation to COSPAR and IAF for the very informative presentation.

84. The Subcommittee noted the progress being made through international cooperation in the International Geosphere-Biosphere Programme. In this regard, the Subcommittee also took note of the continuing programmes of Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Japan, the Netherlands, Sweden, the USSR and the United States. It noted that such a joint international effort was of fundamental importance for examining the future habitability of the planet and for managing the common natural resources of the Earth. The Subcommittee took particular note of the need to involve as many nations as possible in the scientific activities of the programme, both in developed and in developing countries. It agreed that it should remain informed of progress in the programme so as to be able to facilitate international cooperation in that area.

85. The Subcommittee noted the need for further research to reduce the uncertainties in data information extraction and models relating to temperature change, sea-level change, global vegetation cover and other factors related to the Earth environment. The Subcommittee recognized the important contribution that space activities and, in particular, remote-sensing satellites could make to the study of the Earth environment.

86. The Subcommittee took note of the activities being planned as part of programmes for the study of the environment from space, including plans for the Mission to Planet Earth programme. It noted, in particular, plans for the Almaz environmental monitoring system, the Priroda ecological module and the Earth Observing System for making comprehensive observations of the global environment.

The Subcommittee also took note of the proposal for the Protection of the Environment for Assuring a Cleaner Earth (PEACE) satellite system, for a cooperative programme for tropical cyclone monitoring and for a satellite seismic monitoring system. The Subcommittee recommended that States consider participating in such cooperative activities. The Subcommittee took note of a working paper submitted by the USSR (A/AC.105/C.1/L.174).

87. In connection with the proposal for a space system for monitoring the seismic activity of the Earth and for short-term earthquake prediction based on ionospheric and magnetospheric measurements, the Subcommittee invited Member States to provide information on the subject at the next session of the Subcommittee. Some delegations expressed the view that discussions in the Subcommittee on this subject could lead to an international seminar under United Nations auspices and the establishment of a working group of experts to prepare proposals for such a system.

88. The Subcommittee recommended that consideration of the item be continued at its next session.

IX. MATTERS RELATING TO PLANETARY EXPLORATION

89. In accordance with General Assembly resolution 45/72, the Subcommittee continued its consideration of this item. The Subcommittee heard a special presentation on the question by an expert from the United States, as mentioned in paragraph 16 of the present report.

90. The Subcommittee noted that three planetary exploration missions were currently under way. The Magellan spacecraft was in orbit around Venus and was conducting a systematic radar mapping programme. The Galileo spacecraft was on a complex trajectory to Jupiter, where it would make detailed observations of that planet. And the Ulysses spacecraft was on its long trajectory to observe the polar regions of the Sun. The Subcommittee also noted the plans for future spacecraft to study asteroids and comets and to conduct comprehensive investigations of Mars and Saturn. It noted in particular the high degree of international cooperation in all of those investigations and stressed the need to further enhance international cooperation in this field, to enable all countries to benefit from and participate in those activities.

91. The Subcommittee recommended that consideration of the item be continued at its next session.

X. MATTERS RELATING TO ASTRONOMY

92. In accordance with General Assembly resolution 45/72, the Subcommittee continued its consideration of this item. The Subcommittee heard special presentations on the question by experts from Spain and the United States, as mentioned in paragraph 16 of the present report.

93. The Subcommittee noted that the use of spacecraft for making astronomical observations from above the atmosphere had greatly advanced knowledge of the universe by allowing observations in all regions of the electromagnetic spectrum. It noted that with the launching of the Hubble Space Telescope, the Rosat X-ray observatory and the Gamma-1 and Granat astrophysical observatories, astronomers had powerful new tools for their investigations of the universe. The planned launches of the Gamma Ray Observatory, the Lyman Far Ultraviolet Spectroscopic Explorer (FUSE), the Radioastron satellite, the Spektr-Roentgen-Gamma observatory, the Advanced X-ray Astrophysical Facility, the Space Infra-Red Telescope Facility and the Infrared Space Observatory would open up further realms of the Universe to detailed observation. The Subcommittee noted with satisfaction that all of those projects are open to broad international cooperation.

94. The Subcommittee recommended that consideration of the item be continued at its next session.

XI. THE THEME FIXED FOR SPECIAL ATTENTION AT THE 1991 SESSION: "APPLICATIONS OF AIRBORNE AND SATELLITE REMOTE SENSING FOR PROSPECTING MINERAL AND GROUNDWATER RESOURCES AND FOR MONITORING AND MANAGING BIOLOGICAL RESOURCES, WITH EMPHASIS ON AGRICULTURE, TAKING INTO PARTICULAR ACCOUNT THE NEEDS OF DEVELOPING COUNTRIES"

95. In accordance with General Assembly resolution 45/72, the Subcommittee paid special attention to the theme "Applications of airborne and satellite remote sensing for prospecting mineral and groundwater resources and for monitoring and managing biological resources, with emphasis on agriculture, taking into particular account the needs of developing countries". The Subcommittee noted with satisfaction that, at its invitation, COSPAR and IAF had organized a symposium on the theme on 20 and 21 February 1991. The Subcommittee expressed appreciation to COSPAR and IAF for the very instructive symposium. The Subcommittee took note of a working paper submitted by the USSR (A/AC.105/C.1/L.173).

96. The Subcommittee took note of the important contributions of satellite remote sensing for geology, including the use of radar systems for mapping large-scale geological structures, and the use of remote sensing to reveal linear features and multispectral anomalies associated with mineral, oil and gas deposits.

97. The Subcommittee also took note of the applications of satellite remote sensing to the development and management of water resources, including the monitoring of such factors as evaporation, vegetation patterns and surface water for planning and managing irrigation systems. The Subcommittee noted the effectiveness of the use of remote sensing in locating groundwater for rural water supplies.

98. The Subcommittee also noted the applications of remote sensing for monitoring crop condition, evaluating changes in cropping patterns, estimating crop yield, monitoring drought conditions, planning the expansion of cultivated areas, preventing and reversing land degradation and monitoring deforestation.

XII. OTHER MATTERS

A. International Space Year - 1992

99. The Subcommittee noted that the General Assembly, in its resolution 45/72, had urged Member States and international organizations to consider supporting the efforts of the United Nations in connection with International Space Year (ISY), 1992. It also took note of information on the proposed programme for the participation of the United Nations in ISY (A/AC.105/445 and Add.1-4) and noted that a guidebook describing the programme had been distributed to Member States. The Subcommittee noted that 1992 would also be the tenth anniversary of UNISPACE 82.

100. The Subcommittee noted that participation of the United Nations in ISY was to be through voluntary contributions and without any impact on the regular budget of the United Nations or the existing programme of work of the Programme. It also noted that the Secretary-General had sent a note verbale to Member States inviting additional proposals and voluntary contributions from Member States in support of United Nations activities as part of International Space Year. The Subcommittee expressed its appreciation to the Member States and international organizations that had made voluntary contributions for this purpose or were planning to do so. The Subcommittee urged other Member States and international organizations to consider supporting additional scientific and technical activities in cooperation with the United Nations as part of International Space Year. The Subcommittee noted that it was particularly important to increase voluntary contributions for ISY activities to be carried out through the United Nations Programme on Space Applications as the Programme was dependent on voluntary contributions for most of its activities.

101. The Subcommittee considered that the activities to be undertaken by the United Nations and the specialized agencies as part of ISY should be complementary to the activities of international organizations such as COSPAR, IAF, ISPRS and the Space Agency Forum for International Space Year (SAFISY).

102. The Subcommittee noted the significant focus of proposed ISY activities on the use of space technology for studying and monitoring the environment. It noted that the General Assembly had endorsed the Subcommittee's recommendation that Member States, in planning their activities for ISY, should consider ways in which those activities could complement the efforts under way for the United Nations Conference on Environment and Development, also planned for 1992. The Subcommittee recommended that the secretariat of the Conference be invited to provide the Committee on the Peaceful Uses of Outer Space with information on the preparations for that Conference. The Subcommittee recommended that the secretariat should continue to inform the secretariat of the United Nations Conference on Environment and Development regarding matters relating to the Committee on the Peaceful Uses of Outer Space that are of relevance to the Conference.

103. The Subcommittee noted the various national and international programmes being proposed as part of International Space Year and heard special presentations on ISY activities by an expert from Brazil and by a representative of SAFISY (see

para. 16). The Subcommittee noted the importance of including all countries in those programmes and of planning activities that would continue beyond 1992.

104. The Subcommittee requested the Secretariat to keep the Committee and the Subcommittee informed of further developments relating to this question.

B. Space and Earth environment

105. The Subcommittee noted that the General Assembly, in resolution 45/72, had recommended that more attention be paid to all aspects related to the protection and preservation of the outer space environment, especially those potentially affecting the Earth's environment.

106. The Subcommittee also noted that the General Assembly, in resolution 45/72, had considered that it was essential that Member States pay more attention to the problem of collisions with space debris, and other aspects of space debris, and called for the continuation of national research on that question. The Subcommittee noted that research relating to space debris was being carried out by Member States. The Subcommittee took note of a working paper on the subject submitted by Germany (A/AC.105/C.1/L.170). The Subcommittee heard a special presentation on the subject by an expert from India, as mentioned in paragraph 16 of the present report.

107. The Subcommittee noted that there was a need for further research concerning space debris, for the development of improved technology for monitoring space debris and for the compilation and dissemination of data on space debris. It also noted the importance of reducing the generation of space debris. It further noted the importance of international cooperation in addressing these issues.

108. The Subcommittee noted that the General Assembly, in resolution 45/72, had considered that space debris could be an appropriate subject for discussion by the Committee on the Peaceful Uses of Outer Space in the future.

109. The Subcommittee agreed that information on national research on space debris might be provided to the Subcommittee, as had been done in the past. This could be done through provision of working papers, interventions in the general debate and technical presentations by specialists from Member States and COSPAR and IAF.

110. Some delegations expressed the view that the question of space debris should be included on the Subcommittee's agenda at its next session, allowing for a general exchange of views and information. Other delegations, while recognizing the importance of the subject, expressed the view that such consideration was premature until further national research on the problem of space debris had been completed.

C. Other reports

111. The Subcommittee welcomed the annual reports of ESA (A/AC.105/464), INMARSAT (A/AC.105/466), EUTELSAT (A/AC.105/467), INTELSAT (A/AC.105/480) and INTERCOSMOS (A/AC.105/481) and the preliminary version of the thirtieth report of ITU on telecommunication and the peaceful uses of outer space. The Subcommittee requested ITU, ESA, EUTELSAT, INMARSAT, INTELSAT and INTERCOSMOS to continue to report on their work.

112. The Subcommittee expressed its appreciation to COSPAR for its report on the progress of space research during the period 1989-1990 (A/AC.105/479) and to IAF for its report on highlights of space technology during 1990 (A/AC.105/476). The Subcommittee noted that these reports might be published jointly for dissemination to a wider audience.

113. The Subcommittee noted with appreciation the participation in its session of representatives from United Nations bodies, specialized agencies and permanent observers, and found the reports/statements they had made helpful in enabling the Subcommittee to fulfil its role as focal point for international cooperation.

D. Review of the future role and work of the Scientific and Technical Subcommittee

114. The Subcommittee recommended that the agenda of its twenty-ninth session include the following priority items:

(a) Consideration of the United Nations Programme on Space Applications and the coordination of space activities within the United Nations system;

(b) Implementation of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82);

(c) Matters relating to remote sensing of the Earth by satellites including, inter alia, applications for developing countries;

(d) Use of nuclear power sources in outer space.

115. The Subcommittee also recommended that the agenda of the twenty-ninth session include the following items:

(a) Questions relating to space transportation systems and their implications for future activities in space;

(b) Examination of the physical nature and technical attributes of the geostationary orbit; examination of its utilization and applications, including, inter alia, in the field of space communications, as well as other questions relating to space communications developments, taking particular account of the needs and interests of developing countries;

(c) Matters relating to life sciences, including space medicine;

(d) Progress in national and international space activities related to the Earth environment, in particular progress in the geosphere-biosphere (global change) programme;

(e) Matters relating to planetary exploration;

(f) Matters relating to astronomy;

(g) The theme fixed for special attention at the 1992 session of the Scientific and Technical Subcommittee: "Space technology and the protection of the Earth's environment: development of endogenous capabilities, in particular in the developing countries and in the context of International Space Year".

116. The Subcommittee recommended that, regarding agenda item (g) in paragraph 115 above, COSPAR and IAF in liaison with Member States, should be invited to arrange a symposium, with as wide a participation as possible, to be held during the first week of the Subcommittee's session, to complement discussions within the Subcommittee on the special theme.

117. Some delegations expressed the view that the task of the Subcommittee was to discuss policies and guidelines for international cooperation in space activities and to provide agreed technical parameters as a contribution to the development of international space law.

118. Other delegations expressed the view that the Subcommittee's current programme was well balanced and appropriate to its mandate. Those delegations believed that it was important to continue to strengthen the scientific and technical content of the Subcommittee's work.

119. The Subcommittee recommended that special presentations to be made in conjunction with its session should be planned by Member States in the light of the relevance of the technical presentations to the Subcommittee's work and of their contribution to the Subcommittee's substantive consideration of items on the agenda.

120. With regard to the dates for the twenty-ninth session, the Subcommittee recommended that its session be scheduled from 18 to 28 February 1992.

Annex I

DOCUMENTS BEFORE THE SCIENTIFIC AND TECHNICAL SUBCOMMITTEE AT ITS TWENTY-EIGHTH SESSION

Item 1 - Adoption of the agenda

A/AC.105/C.1/L.169	Provisional agenda, with annotations, for the twenty-eighth session

Item 4 - United Nations Programme on Space Applications and the coordination of space activities within the United Nations system

Item 5 - Implementation of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space

A/AC.105/460/Add.1	List of experts in space technology and applications: report of the Secretariat
A/AC.105/463	Report on the United Nations International Training Course on Remote-Sensing Education for Educators, held in cooperation with the Government of Sweden, Stockholm and Kiruna, Sweden, June 1990
A/AC.105/465 and Corr.1	Coordination of outer space activities within the United Nations system: programme of work for 1991 and 1992 and future years: report of the Secretary-General
A/AC.105/468	Seminars of the United Nations Programme on Space Applications: Selected Papers on Remote Sensing and Satellite Communications - 1991
A/AC.105/469	United Nations Workshop on Space Communications for Development, Havana, March 1990
A/AC.105/471	Report of the United Nations/Food and Agriculture Organization of the United Nations/European Space Agency Workshop on Microwave Remote Sensing Technology organized in cooperation with the Government of Brazil, São José dos Campos, Brazil, November 1990
A/AC.105/472	See Working Group of the Whole to evaluate the implementation of UNISPACE 82, below
A/AC.105/473	See Working Group of the Whole to evaluate the implementation of UNISPACE 82, below
A/AC.105/474	See Working Group of the Whole to evaluate the implementation of UNISPACE 82, below

A/AC.105/475	See Working Group of the Whole to evaluate the implementation of UNISPACE 82, below
A/AC.105/478	Report of the United Nations Expert on Space Applications to the Scientific and Technical Subcommittee, February/ March 1991
ACC/1990/PG/9	Report of the Ad Hoc Inter-Agency Meeting on Outer Space Activities, held at the Food and Agriculture Organization of the United Nations headquarters, Rome, 26-28 September 1990
A/AC.105/C.1/L.171	Information on opportunities for preparatory training of scientific research workers in the USSR and stipends available for the purpose of expanding cooperation in the peaceful uses of outer space: working paper submitted by the USSR

Item 6 - Matters relating to remote sensing of the Earth by satellites, including, inter alia, applications for developing countries

Item 14 - The theme fixed for special attention at the 1991 session of the Scientific and Technical Subcommittee: "Applications of airborne and satellite remote sensing for prospecting mineral and groundwater resources and for monitoring and managing biological resources, with emphasis on agriculture, taking into particular account the needs of developing countries"

A/AC.105/C.1/L.173	Applications of space photography to the study and forecasting of mineral and biological resources: working paper submitted by the USSR

Item 7 - Use of nuclear power sources in outer space

A/AC.105/C.1/L.176	Use of nuclear power sources in space: working paper submitted by the United States

Item 10 - Matters relating to life sciences, including space medicine

A/AC.105/C.1/L.172	Methods based on the results of research in space biology and medicine: working paper submitted by the USSR
A/AC.105/C.1/L.177	Results of space-related research in the Netherlands: working paper submitted by the Netherlands

Item 11 - Progress in national and international space activities related to the Earth environment, in particular progress in the geosphere-biosphere (global change) programme

A/AC.105/C.1/L.174	Progress in national and international space activities related to the Earth environment, in particular progress in the geosphere-biosphere (global change) programme: working paper submitted by the USSR

Item 15 - Other matters:

(a) Other reports

(b) Review of the future role and work of the Scientific and Technical Subcommittee

A/AC.105/445 and Add.3-4	Participation of the United Nations in International Space Year: note by the Secretariat
A/AC.105/476	Highlights in space technology and applications of 1990: report submitted by the International Astronautical Federation (IAF)
A/AC.105/477	See Working Group of the Whole to evaluate the implementation of UNISPACE 82, below
A/AC.105/479	Progress of space research 1989-1990: report submitted by the Committee on Space Research of the International Council of Scientific Unions
A/AC.105/480	Report of the International Telecommunications Satellite Organization (INTELSAT)
A/AC.105/481	Annual Review of the Council on International Cooperation in Research and Uses of Outer Space: note by the Secretariat
A/AC.105/482	WMO Tropical Cyclone Programme: report by the World Meteorological Organization (WMO)
A/AC.105/C.1/L.170	Space debris: status of work in Germany: working paper submitted by Germany

Working Group of the Whole to Evaluate the Implementation of the Recommendations of UNISPACE 82

A/AC.105/470	International cooperation in the peaceful uses of outer space - activities of Member States: note by the Secretariat

A/AC.105/470/Add.1	International cooperation in the peaceful uses of outer space - activities of Member States - United States: note by the Secretariat
A/AC.105/472	Applications of space technology to flood monitoring and control: study by the Secretariat
A/AC.105/473	Cooperative arrangements in support of the implementation of the United Nations Programme on Space Applications: report of the Secretariat in response to the request of the Working Group of the Whole
A/AC.105/474	Report on economic aspects of strengthening and expanding national and regional data banks and establishing an international space information service as a coordinating centre: report of the Secretariat in response to the request of the Working Group of the Whole
A/AC.105/475	Implementation of the recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space - actions by international organizations: report of the Secretariat in response to the request of the Working Group of the Whole
A/AC.105/477	Upper atmosphere studies for weather and environment monitoring: study by the Secretariat
A/AC.105/C.1/WG.6/L.5 and Corr.1 and L.6	Working paper submitted by the Group of 77 and draft report of the Working Group of the Whole to Evaluate the Implementation of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space on the work of its fifth session

Annex II

REPORT OF THE WORKING GROUP OF THE WHOLE TO EVALUATE THE IMPLEMENTATION OF THE RECOMMENDATIONS OF THE SECOND UNITED NATIONS CONFERENCE ON THE EXPLORATION AND PEACEFUL USES OF OUTER SPACE ON THE WORK OF ITS FIFTH SESSION

1. The Working Group of the Whole to Evaluate the Implementation of the Recommendations of the Second United Nations Conference on the Exploration and Peaceful Uses of Outer Space (UNISPACE 82) was re-established for its fifth session by the Scientific and Technical Subcommittee in accordance with paragraph 11 of General Assembly resolution 45/72 of 11 December 1990, with a view to improving the execution of activities relating to international cooperation, particularly those included in the United Nations Programme on Space Applications, and to proposing concrete steps to increase such cooperation as well as to make it more efficient. The Working Group held a series of meetings from 21 to 26 February 1991, during the twenty-eighth session of the Scientific and Technical Subcommittee. At its meeting on 26 February 1991, the Working Group adopted the present report.

2. Mr. Muhammad Nasim Shah (Pakistan) was elected Chairman of the Working Group. The Chairman, in his opening statement, reviewed the mandate of the Working Group for its fifth session and the status of the implementation of the recommendations of UNISPACE 82.

3. In considering the item, the Working Group had before it the studies and reports prepared by the Secretariat, Member States and international organizations, as requested by the Working Group at its fourth session and endorsed by the General Assembly in paragraph 10 of resolution 45/72. The Working Group also had before it a working paper submitted by the Group of 77, contained in document A/AC.105/C.1/WG.6/L.5 and Corr.1.

4. The Working Group noted with satisfaction that efforts were being made by the United Nations, Member States and other relevant international organizations to implement the recommendations of UNISPACE 82. Bearing in mind that many of the recommendations were yet to be implemented, the Working Group proposed that the following should be undertaken, keeping in view the priorities contained in paragraph 8 of General Assembly resolution 45/72:

(a) The emphasis of the United Nations Programme on Space Applications should remain on long-term, project-oriented on-the-job training in space technology itself as well as its specific application areas, in particular, new developments in satellite systems, software for remote sensing and use of digital processing systems and training for management of ground stations. In order to facilitate the development by the developing countries of their indigenous research and development capabilities, the number of trainees from each country should be sufficient to create a national core group of experts. The Working Group noted with appreciation the offers of fellowships made by some Member States and international organizations in that regard and urged other Member States and international organizations to make similar contributions. The Outer Space Affairs

Division of the United Nations Secretariat should make every effort to arrange for the increase in the number of fellowships offered and to encourage full utilization of the fellowships. In that regard, the Outer Space Affairs Division should devote, as much as possible, the resources allocated to it for the implementation of the Programme on Space Applications.

(b) In the light of the continued development and evolution of space activities, the Committee should request all States, particularly those with major space or space-related capabilities, to continue to inform the Secretary-General annually, as appropriate, about those space activities that were or could be the subject of greater international cooperation, with particular emphasis on the needs of the developing countries, in order to permit a better assessment of the present and future of such international cooperation by the Working Group at its next session.

(c) Similarly, the Committee should also request international organizations with space-related activities to continue to inform the Secretary-General annually concerning those space activities that were or could be the subject of greater international cooperation, with particular emphasis on the needs of the developing countries, in order to permit a better assessment of the present and future of such international cooperation by the Working Group at its next session.

(d) In order to promote better access to and experiences in higher education in space-related subjects, the United Nations should, upon request, continue to arrange for the provision of consultancy in the form of experts from the developed and developing countries in the preparation of an integrated national plan of action for initiating, strengthening or reorienting an appropriate space applications programme which should be in conformity with other national development programmes. Based on such requests, the Outer Space Affairs Division should maintain a periodically updated list of experts in space technology and applications, in consultation with Member States and their national space authorities, to facilitate the exchange of consultants at the international level.

(e) In formulating cooperative programmes and projects, intensive participation of international and regional financial and development institutions should be encouraged by the United Nations. In this connection, the Secretariat should continue to prepare annually a report on the arrangements it has made with other organs, bodies and organizations of the United Nations system and other regional/international organizations in order to utilize fully the available resources and to secure additional financial support from other sources for continued implementation of the United Nations Programme on Space Applications.

(f) Extensive cooperation should be encouraged among countries within a region through sharing their human resources, technical expertise, hardware and software for the space-related projects. If a country or countries within a region find it beyond their resources to undertake a programme by themselves, the United Nations should, upon request, endeavour to coordinate with them towards establishing a regional programme addressing the needs of those countries.

(g) Encouragement should be given to non-governmental organizations which, by means of conferences, publications and other activities including the holding of symposia and meetings devoted to special topics, could help to integrate regional and interregional efforts in order to facilitate and coordinate the space activities of scientific organizations. The United Nations should strengthen its cooperation with them, as part of its commitment to assisting developing countries to attain the benefits of space technology including its spin-offs. Efforts should also be made by the United Nations to seek the cooperation of other international and regional bodies specialized in space activities.

(h) On the basis of the information provided by the States, the Division should prepare on a regular basis an updated report on the resources and technological capabilities of the States in the fields of space activities for the promotion of cooperation in the peaceful uses of outer space. Similarly, the Division should periodically update the report on the capabilities of States in the areas of education, training, research and fellowship opportunities, for the promotion of cooperation in the peaceful uses of outer space.

(i) Countries with relevant capabilities are once again encouraged to provide to the developing countries financial and technical assistance for developing low-cost community receivers for communication satellites and low-cost, preferably renewable, power sources to operate the systems in unelectrified locations.

(j) Given the investments already made on the ground by many countries in the form of ground stations, processing equipment, data banks, software, etc., for remote-sensing data reception/analysis, satellite-operating States are urged to ensure the availability of data on a continued basis and in a form compatible with the current systems.

(k) Taking into account paragraph 8 (c) of General Assembly resolution 45/72, the United Nations should continue to lead, with the active support of its specialized agencies and other international organizations, an international effort to establish regional centres for space science and technology education in existing national/regional educational institutions in the developing countries. The Working Group noted with appreciation the working project documents that had been prepared in this regard by the Secretariat and that they were being brought to the attention of all Member States with an appeal for financial and material support for the establishment of these centres.

5. The Working Group took note, with appreciation, of the different reports prepared by the Secretariat regarding the status of the implementation of the various recommendations of UNISPACE 82. Bearing in mind that International Space Year will take place in 1992, coinciding with the tenth anniversary of the holding of the UNISPACE 82 Conference, the Working Group decided to make, at its next session, a comprehensive assessment of the implementation of the recommendations of UNISPACE 82. The Working Group requests the Secretariat to prepare a background paper to assist the Working Group in this regard, taking into account previous reports already prepared by the Secretariat.

6. Noting that some of the space applications studies recommended by UNISPACE 82 were incomplete and some of them were limited in scope, the Working Group proposed that:

(a) In the case of priority studies recommended by UNISPACE 82, information from different reports should be integrated and new information should be compiled in order to provide Member States with comprehensive studies;

(b) Based upon the results obtained in implementation of subparagraph (a) above, a few specific studies should be carried out to demonstrate the potentials of space technology, which might include the following:

(i) Integrated land and water resources management for rural development;

(ii) Remote and rural area communications and broadcasting;

(iii) Forest resources management;

(iv) Desertification;

(v) Ocean resources development.

As a first step, information on some of those subjects might be provided as part of the United Nations efforts in conjunction with International Space Year. The Working Group noted with appreciation the studies prepared by the Secretariat on applications of space technology to flood monitoring and control (A/AC.105/472) and on upper atmosphere studies for weather and environment monitoring (A/AC.105/477).

7. The Working Group recommended that it be reconvened next year to continue its work.